Name: Date:

Polynomial Factoring solution (version 609)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 8x + 43 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(43)}}{2(1)}$$

$$x = \frac{-(-8) \pm \sqrt{64 - 172}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{-108}}{2}$$

$$x = \frac{8 \pm \sqrt{-36 \cdot 3}}{2}$$

$$x = \frac{8 \pm 6\sqrt{3}\, i}{2}$$

$$x = 4 \pm 3\sqrt{3}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $4 + 6i$ and $-3 + 5i$ in standard form $(a + bi)$.**

Solution

$$(4 + 6i) \cdot (-3 + 5i)$$

$$-12 + 20i - 18i + 30i^2$$

$$-12 + 20i - 18i - 30$$

$$-12 - 30 + 20i - 18i$$

$$-42 + 2i$$

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3. **Write function $f(x) = x^3 - 5x^2 + 2x + 8$ in factored form. I'll give you a hint: one factor is $(x - 2)$.**

Solution

$$\begin{array}{c|cccc} & 1 & -5 & 2 & 8 \\ 2 & & 2 & -6 & -8 \\ \hline & 1 & -3 & -4 & 0 \end{array}$$

$$f(x) = (x-2)(x^2 - 3x - 4)$$

$$f(x) = (x-2)(x-4)(x+1)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x+5) \cdot (x+1) \cdot (x-4)^2 \cdot (x-7)^2$$

Sketch a graph of polynomial $y = p(x)$.